

HIGHWAY TRAFFIC NOISE POLICY

STATE OF MAINE

DEPARTMENT OF TRANSPORTATION

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1. BACKGROUND

- A. The Federal Highway Administration (FHWA) issued a directive on June 12, 1995 stating that within one year from this date the Department must adopt a written statewide noise policy and have it approved by the FHWA. The policy must demonstrate substantial compliance with the Federal noise regulation, Procedures for Abatement of Highway Traffic and Construction Noise, 23 CFR 772 as well as with the reissued FHWA Policy and Guidance document dated June, 1995. This traffic and construction noise policy and procedures should be a guide for judgment in decision making on noise matters during the project development process.
- B. A formal, written noise policy can assist in the management of the highway traffic noise analysis and abatement decision making process. It will allow for more uniform and equitable treatment of problems and issues and provide a rational basis for decision making. It will help the traffic noise analyst by serving as a reminder and a guide for management decision making and by documenting the decision making process to aid in answering questions raised by the general public and elected officials.

2. PURPOSE

- A. The purpose of this document is to establish a policy for noise abatement measures due to Highway Traffic Noise for Type I and Type II projects on highways of the State of Maine.

3. POLICY

- A. It is the policy of the Maine Department of Transportation (MDOT) to establish, maintain, and periodically update guidelines for a Type I and Type II Noise Abatement Program. This policy implements the requirements of Title 23, Part 772 of the U.S. Code of Federal Regulations (23 CFR 772) and the noise related requirements of the National Environmental Policy Act of 1969. It is applicable to Type I and Type II projects and provides a basis for statewide consistency and uniformity in the identification of highway traffic impacts and the implementation of reasonable and feasible noise abatement measures. The implementation of Type II projects is optional and not required by Federal Law or FHWA regulations.

4. RESPONSIBILITY

- A. The Bureau of Project Development is responsible for implementing the policy for a Type I and Type II Noise Abatement Program
- B. Division Offices have the responsibility to be certain that local officials are aware of Type II requirements.

5. **APPLICABILITY**

- A. This policy applies to all Type I projects as defined by the regulation. A Type I project is a proposed highway project for the construction of a highway on new location or the physical alteration of an existing highway which significantly changes either the horizontal or vertical alignment or increases the number of through-traffic lanes.
- B. A Type II project is a proposed highway project for noise abatement on an existing highway commonly called a "retrofit" noise abatement project. ,
- C. Type II noise abatement measures will not normally be considered for those activities and land uses which come into existence after May 14, 1976, the date that the FHWA regulation was first issued. However, noise abatement measures may be considered for activities and land uses which come into existence after May 14, 1976, provided authorities in the local jurisdiction have taken action to exercise land use control over the remaining undeveloped lands adjacent to highways that will prevent further development of incompatible activities. After June 12, 1995, the date of an FHWA memorandum changing the existing policy, Type II projects may be considered only if an active local land use control program was adopted prior to the existence of the new development. In no case, however, shall Type II noise barriers be considered along lands that were developed or were under substantial construction after approval of the acquisition of the right-of-way for or construction of the existing highway per National Highway System Designation Act of 1995, P.L. 104-59, November 15, 1995.
- D. If a traffic noise impact is identified, the abatement measures listed below must be considered:
 - 1. Traffic management measures such as traffic control devices and signing for prohibition of certain vehicle type, time-use restrictions for certain vehicle types, modified speed limits, and exclusive lane designations.
 - 2. Alteration of horizontal and vertical alignments.
 - 3. Construction of noise barriers with the acquisition of property rights (either in fee or lesser interest)
 - 4. Construction of noise barriers (including landscaping for aesthetic purposes) within the highway right-of-way.
 - 5. Acquisition of real property or interests therein (predominantly unimproved property) to serve as a buffer zone to pre-empt development which would be adversely impacted by traffic noise. This measure may be included in Type I projects only.

6. Noise insulation of publicly owned school buildings which are off the highway right-of-way in connection with a Department construction project. It must be determined that it is in the best interest of the State considering, among other factors, the cost and feasibility of other alternatives for this measure to be recommended.

6. **DEFINITIONS**

- (a) Design Year. The future year used to estimate the probable traffic volume for which a highway is designed. A time of 20 years, from the start of construction is usually used.
- (b) Existing Noise Level. The noise, resulting from the natural and mechanical sources and human activity, present in a particular area.
- (c) Leq. The equivalent steady - state sound level which in a stated period of time contains the same acoustic energy as the time-varying sound level during the same time period.
- (d) Leq (h). The hourly value of Leq.
- (e) Traffic Noise Impacts. Impacts which occur when the predicted traffic noise levels approach or exceed the noise abatement criteria (Table 1), or when the predicted traffic noise levels substantially exceed the existing noise levels.
- (f) Type I Projects. A proposed highway project for the construction of a highway on new location or the physical alteration of an existing highway which substantially changes either the horizontal or vertical alignment or increases the number of through traffic lanes.
- (g) Type II Projects. A proposed highway project for noise abatement on an existing highway.
- (h) Insertion Loss (IL). Is calculated by subtracting the sound level with the barrier from the sound level without the barrier.
- (i) Impacted Receiver. Any receiver which approaches (within 1dBA) or exceeds the Noise Abatement Criteria (NAC) for the corresponding land use category, or any receiver that exceeds existing noise levels by 15 dBA.
- (j) dBA. A weighted decibel unit used to measure noise that best corresponds to the frequency response of the human ear.
- (k) FHWA. Federal Highway Administration.

- (l) Barrier. A solid wall, earth berm, or wall/berm combination located between the roadway and a ground-level receiver location, which breaks the line-of-sight between the receiver and the roadway noise sources. Earth berm and berm/wall combinations are preferred where space and other environmental constraints permit. The barrier is designed to reduce exterior traffic noise levels at a ground level property adjacent to the highway.
- (m) Receiver/Receptor. The precise ground level location on any property where frequent outdoor activity is found to occur.

MAINE DEPARTMENT OF TRANSPORTATION
TABLE 1 - NOISE ABATEMENT CRITERIA (NAC)
[Hourly A - Weighted Sound Level -- decibels (dBA)]

Activity Category	Leg(h)	Description
A	57 (Exterior)	Lands on which serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose.
B	67 (Exterior)	Picnic areas, recreation areas, playgrounds, active sports areas, parks, residences, motels, hotels, schools, churches, libraries, and hospitals.
C	72 (Exterior)	Developed lands, properties, or activities not included in Categories A or B above.
D	-----	Undeveloped lands.
E	52 (Interior)	Residences, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals, and auditoriums.

7. ANALYSIS

- A. The traffic noise analysis shall include the following steps for each alternative under detailed study.
1. Identification of existing activities.
 2. Type II projects will be considered only along lands where land development or substantial construction predated the existence of any highway.

3. The granting of a building permit, filing of a plot plan, or a similar action must have occurred prior to right-of-way acquisition or construction approval of the original highway.
4. Noise abatement measures will not be approved at locations where such measures were previously determined not to be reasonable and feasible for a Type I project.
5. The locality has in effect an ordinance requiring developers or individuals to include noise abatement in their plans for residential and other noise sensitive developments adjacent to existing highways or approved highway corridors. A highway corridor is considered approved once FHWA issues a Record of Decision (ROD), Finding of No Significant Impact (FONSI), or Categorical Exclusion (CE) for a specific project.
6. The ordinance must be in effect prior to the submission of any locations for consideration and must require that all noise abatement measures constructed by developers must at a minimum provide 7 dBA Insertion Loss (IL) for each structure or activity that the abatement measures are designed to protect.
7. Noise Abatement measures located within or adjacent to the state highway right of way must comply with MDOT's design, construction and materials specifications. In addition, the design must be reviewed and approved by MDOT. The local municipality, and not the developer, will be responsible for maintaining such noise abatement measures if constructed within the State Right of Way.
8. The threshold of noise reduction which establishes a benefited property is five (5) decibels.

8. **COORDINATIONS WITH LOCAL OFFICIALS**

- A. MDOT will encourage communities and developers to practice noise compatible development, and local coordination will be accomplished through the distribution of highway project environmental documents and noise study reports.
- B. Coordination with and providing information to local officials is an important part of noise control and the prevention of future impacts. Highway traffic noise should be reduced through a program of shared responsibility. Local government should use their power to regulate land development in such a way that particularly noise sensitive land uses are either prohibited from being located adjacent to a highway or that developments are planned, designed, and constructed so that traffic noise impacts are minimized. Thus, local government officials need to know what noise levels to expect from a highway and what techniques they can use to prevent future impacts.

C. The Department shall inform local officials within whose jurisdiction the highway project is located of the following:

1. The best estimation of future highway traffic noise levels for both developed and undeveloped lands in the immediate vicinity of the project. The eligibility for Type 11 projects as described by Federal law and regulation and by this policy. The critical importance of a prior active local land use control program must be communicated and emphasized.

9. CONSTRUCTION NOISE

A. The following general steps are to be performed for all Type I and Type II projects:

1. Identify land uses or activities which may be affected by noise during construction of the project. The identification is to be performed during the project development studies.
2. Determine the measures which are needed in the plans and specifications to minimize or eliminate adverse construction noise impacts to the community. This determination will include a weighing of the benefits achieved and the overall adverse social, economic and environmental effects and the costs of the abatement measures.
3. Incorporate the needed abatement measures in the plans and specifications.
4. The Contractor shall take measures to control the noise intensity caused by his construction operations and equipment including but not limited to equipment used for drilling, pile driving, blasting, excavation and hauling.
5. All methods and devices employed to minimize noise shall be subject to the continuing approval of the engineer. The maximum allowable level of noise, at the nearest residence or occupied building shall be 90 decibels on the "A" weighted scale (dBA). Any operation that exceeds the standard will cease until a different construction methodology is developed to allow the work to proceed within the 90 dBA limit.

10. EXTENUATING CIRCUMSTANCES

A. There may be extenuating circumstances where unique or unusual conditions warrant special consideration of highway traffic noise impacts and/or implementation of noise abatement measures. This could involve the following areas:

- That are extremely noise sensitive
- Where severe traffic noise impacts are anticipated, or
- That contain Section 4(f) resources

- B. If a municipality insists on providing a noise abatement measure deemed unnecessary by MDOT, arrangements may be made for the use of MDOT's right of way, provided that the local community is willing to assume 100% of the cost of the abatement measure, including but not limited to preliminary engineering, construction and maintenance, that MDOT's materials, design and construction specifications are met, and that MDOT's review and approval of the design for both engineering and aesthetics is obtained.

11. FUNDING

- A. Type I projects will be funded as part of the Highway Project.
- B. Type II projects (Retrofit) noise abatement projects are funded with Federal, State and Local dollars. The municipality must participate in the design and construction costs of the proposed noise abatement measures depending on the roadways' functional classification.

12. ELIGIBILITY REQUIREMENTS

- A. An area or site must meet the following criteria to be eligible for a Type I and Type II Noise Abatement Program.
 - 1. Existing land use control must be exercised by local authorities with controls over undeveloped lands adjacent to highways to prevent further development of incompatible activities.
 - 2. Impacted receptors must be adjacent to a highway project and reflect the land use categories of the Noise Abatement Criteria.
 - 3. There must be an Impacted Receiver or a noise impact which will be defined by a minimum Leq(h) at the right-of-way line of the highway and the activity center of the abutting properties.
 - 4. Noise barriers must be reasonable and feasible.
 - 5. Maximum barrier height is 20 feet.
 - 6. The project must be eligible for federal-aid construction costs.
 - 7. Overall cost of abatement shall be equal to or less than \$20,000 per impacted receiver.
 - 8. A noise barrier that is not reasonable, based on its anticipated cost, may be viable if the municipality elects to pay the amount above the allowable cost. No barrier will be funded by the Department, regardless of contribution sharing, which does not meet the "Feasibility" requirements.

13. **THE INCORPORATION OF FEASIBLE AND REASONABLE NOISE MITIGATION MEASURES**

Feasibility

Feasibility deals with engineering considerations. Can a 7 dBA or greater noise reduction be achieved given the geometry and topography? Cross streets, ramps, entrances, access to property and other noise sources will influence the amount of noise reduction that can be achieved. Safety, maintenance, drainage, snow removal and environmental impacts are important considerations in determining whether a barrier is feasible.

For initial screening purposes, an attempt should be made to attain a 10 dBA insertion loss (IL) at the first row benefited receivers, with the majority of the first row benefited receivers attaining a minimum of 7 dBA insertion loss. Safety factors that should be considered in the design of the barrier include maintaining a clear recovery zone, redirection of crash vehicles, adequate sight distance, and fire/emergency vehicle access. The design of the barrier should also consider environmental impacts such as wetlands, historic properties, animal migratory paths, etc.

The construction of a noise barrier is NOT FEASIBLE if at least a 7 dBA noise reduction cannot be achieved.

Reasonableness

Reasonableness implies that common sense and good judgment have been applied in arriving at a decision. The overall noise abatement benefits must outweigh the overall adverse social, economic, and environmental effects and the costs of the abatement measures. Reasonableness will be based on a number of factors which include number of units protected, cost effectiveness, land use, future noise levels and the residents' desires. Noise barriers will not be built if most affected residents do not want them.

- A. Type II traffic noise abatement is not considered to be reasonable, under the following circumstances:
 - 1. At locations with uncontrolled access to abutting property.
 - 2. At locations where a minimum 7 dBA benefit in noise climate can not be achieved with abatement for the first row receptors, at the center of the noise abatement system.
 - 3. At locations where the height of a barrier must be greater than 20 feet above the ground elevation to achieve a minimum noise reduction benefit of 7 dBA (at the center of the noise abatement system for first row receptors).

14. **PROCEDURES AND GUIDELINES**

- A. The following procedures and guidelines shall be pursued to identify noise impacted areas.

1. A review will be conducted of all pertinent information of the subject area including, but not limited to: aerial photographs and mapping, construction and right-of-way plans, and land use records, to identify sensitive receivers and obtain topographic data and elevations.
 2. A preliminary field reconnaissance will be conducted to positively identify receptors, take field measurements as necessary, and to verify data on maps, plans, and to identify any non-feasible locations.
 3. The present and the design year traffic data shall be analyzed, including design and maximum speeds, the Annual Average Daily Traffic (AADT), the percentage of heavy trucks, medium trucks, and automobiles, and the directional distribution factor.
 4. All computer modeling will be done using the current FHWA Highway Traffic Noise Prediction Model and Noise Barrier Cost Reduction Procedure.
 5. For the segments where barriers are feasible, the ambient noise will be measured and the barrier heights, lengths, and costs needed to provide a substantial noise level reduction at the subject sites will be determined using the current FHWA Highway Traffic Noise Prediction Model.
 6. Only first floor receivers will be considered in barrier design for multi-story structures.
- B. After a project is determined to meet or exceed the NAC, residents in the impacted areas will be notified. The concerns and sentiments of these residents regarding the existing noise and possible abatement measures will be determined through, personal contact, questionnaires or public meetings which will be held to provide information about possible abatement measures. The views of the impacted residents will be a major consideration in reaching a decision on the reasonableness of abatement measures to be provided. Noise barriers will not be built if most affected residents do not want them.
- C. The traffic noise analysis will include the following:
1. Traffic noise analysis will be done for developed lands and undeveloped lands for which development is planned, designed, and programmed. Development will be deemed to be planned, designed, and programmed if a noise-sensitive land use, such as a residence, school, church, hospital, library, etc., has received site approval or a building permit from the local agency with jurisdiction at the time the noise analysis is performed. The date of public knowledge shall be the date of approval of the project's environmental documents, i.e., the date of approval of the CE, FONSI or ROD. Subsequent to this date, the MDOT is responsible for analyzing changes in traffic noise impacts, when appropriate, but is no longer responsible for providing noise abatement for new development.

2. Determination of existing noise levels.
 3. Prediction of traffic noise levels.
 4. Determination of traffic noise impacts.
 5. Examination and evaluation of alternative noise abatement measures for reducing the noise impacts.
 6. Consideration of benefits and cost of abatement measures versus overall social, economic, and environmental effects.
 7. The noise analysis shall comply with the Federal Highway Administration requirements for Highway Traffic Noise analysis as described in 23 CFR 772.
- D. Economical reasonableness is assumed to be achieved if:
1. The overall cost of Abatement including construction, engineering, and right-of-way is equal to or less than 520,000 per benefited receiver.
 2. All benefited receivers and any other receiver with a minimum 5 dBA insertion loss will be considered in the above calculations.
- E. The last step of the analysis will include selection of the noise abatement measures to be used, if abatement is deemed feasible.
- F. After abatement is complete, follow-up measures will be taken to determine the effectiveness of the abatement, to verify the computer mode analysis, and to provide for maintenance.

15. **REASONABLENESS FACTORS**

"YES" means construction of a barrier is reasonable.

"NO" means construction of a barrier is not reasonable.

"HIGH" and "LOW" indicate differences in degree of reasonableness.

YES		NO	
HIGH	LOW	LOW	HIGH
Supports Mitigation		Neutral	Does Not Support Mitigation

High Yes = Very likely to mitigate

Low Yes = Might Mitigate

Low No = Probably won't mitigate

High No = Definitely won't Mitigate

The following reasonableness factors are to be used with the checklist.
See Attachment 1.

1. Number of Units Protected

Units with at least a 5 dBA reduction	Reasonableness	
>6	High	Yes
6-4	Low	Yes
4-2	Low	No
2-0	High	No

2. Cost Effectiveness Index (CEI)

A Cost Effectiveness Index (CEI) should be calculated for each barrier. The units of CEI are:

\$\$/Unit

Where:

SS = total barrier cost

Unit = number of receivers protected

All receivers beyond the Right-of-Way attaining at least a 5 dBA IL will be counted as "protected" and included in the cost effectiveness calculation. All noise barriers shall be designed to protect ground level exterior activity. Only receivers at a ground level property will be included in a cost effectiveness calculation. For the purpose of developing the CEI, calculation shall be based on the square meter (square foot) cost of the most recently constructed noise barrier of the same material. If actual barrier costs are not available, a cost of \$215.00 per square meter (\$20.00 per square foot) will be used; realizing that actual costs will vary. Every effort should be made to keep the overall cost under \$20,000/unit.

\$\$/Unit	Reasonableness	
<\$20,000	High	Yes
\$20,000 - \$25,000	Low	Yes
\$25,000 - \$30,000	Low	No
<\$30,000	High	No

It should be noted that, if a noise barrier is not reasonable based on its anticipated cost but the municipality expresses a desire to pay the difference above the allowable costs, this option will be further explored and considered to be a viable option. No barrier will be funded by the Department, regardless of contribution sharing, which does not meet the "Feasibility" requirements.

3. Land Use

The Department will not generally consider noise abatement for areas zoned industrial or commercial. In areas that have mixed zoning and are clearly evolving from residential to commercial or industrial uses, the Department will not generally consider it reasonable to mitigate for noise impacts.

At least 50% of the properties in the area should be noncommercial for a barrier to be considered.

% of Residential Properties	Reasonableness	
> 90	High	Yes
65-90	Low	Yes
50-65	Low	No
< 50	High	No

4. Future Noise Levels - Greater than or Equal to 66 dBA

Future Noise Level dBA Leq(h)	Reasonableness	
> 75	High	Yes
66-74	Low	Yes
60-65	Low	No
< 60	High	No

5. Build vs. Existing Noise Levels

Increase In Noise Level (dBA)	Reasonableness	
> 15	High	Yes
13-15	Low	Yes
10-13	Low	No
< 10	High	No

6. Residents Desires

A Low No or a High No in this case is sufficient justification in itself to eliminate an area for consideration.

Property Owners in Favor	Reasonableness	
> 90	High	Yes
75-90	Low	Yes
50-75	Low	No
< 50	High	No

This noise policy is approved by:

John E. Dority, Chief Engineer

Date _____

Paul L. Lariviere, Administrator, FHWA

Date _____

ATTACHMENT 1

Date: _____

NOISE BARRIER FEASIBILITY AND REASONABLENESS CHECKLIST

Project Name: _____ PIN _____

Proposed Barrier Location: _____

Feasibility

Can a 7 dBA insertion loss be achieved? YES _____ NO _____

Reasonableness

<u>Reasonableness Factors:</u>	YES		NO	
	High	Low	Low	High
1. Number of Units Protected	_____	_____	_____	_____
2. Cost Effectiveness Index	_____	_____	_____	_____
3. Land Use	_____	_____	_____	_____
4. Future Noise Levels	_____	_____	_____	_____
5. Build vs. Existing Noise Level	_____	_____	_____	_____
6. Residents Desires	_____	_____	_____	_____

Additional Considerations:

Decision

Is the Barrier Feasible? YES _____ NO _____

Is the Barrier Reasonable? YES _____ NO _____

Reasons for Decision: _____
